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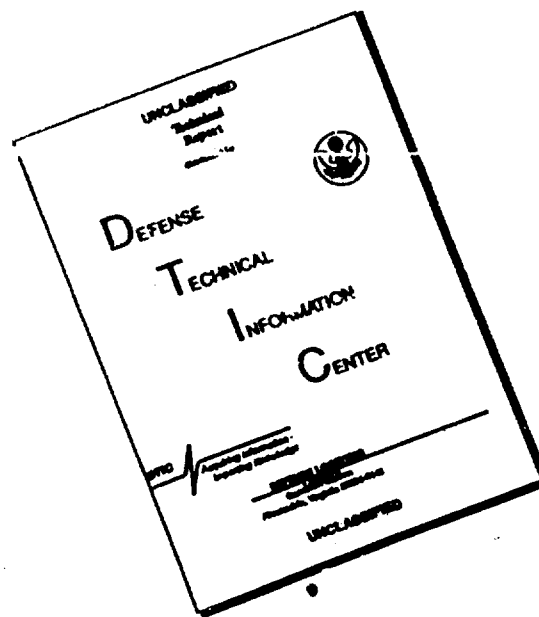
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Changes in the Composition of Gastric Fluid from the Effect of Pain Stimulus.

by A. S. Yampol'skiy (Ivanovo)

Translated from *Russk. Fiziol.*, 2: 6: 51-52, 1958, by the Technical Library, Technical Information Division, U. S. Army Chemical Corps Biological Laboratories, Fort Detrick, Frederick, Maryland.

There is a large quantity of literary data concerning the effect of pain on the digestion in the stomach. In the majority of the investigations, however, the basic approach has been to the changes in the quantity of the gastric juices. We have investigated the qualitative changes of the gastric juice which result as an effect of a strong pain stimulus.

The experiments were conducted on three dogs with their stomachs isolated according to the Pavlov method, and on one dog according to the Heidenhain method. The pain stimulus was inflicted for a period of 30 seconds on the shaved skin of the leg, moistened with a physiological solution, from an electrical device's secondary coil that is thrust closely to the primary coil. The voltage in the primary coil was 6 v. The flow of the juice on the meat was observed for a period of three hours, whereupon we determined in each hourly portion of juice the free, fixed, and total hydrochloric acid, total acidity, chlorides, activity of the protease and lipase, total and residual nitrogen, specific weight, dry remainder, and amount of organic and inorganic substances. We conducted 92 experiments. In the first series the pain stimulus was inflicted immediately after eating (meat), and the second within one hour after eating, that is, at the time of maximum secretion.

In the first series of experiments the quantity of juice in two of the dogs was decreased, and in two unchanged. In the second series of experiments the pain stimulus produced a decrease in the juice flow in all the dogs and sometimes a complete cessation of the juice flow for 15-20 minutes. In both series of experiments the quantity of free hydrochloric acid was somewhat decreased from the effect of the pain, and the fixed was increased, whereas the total hydrochloric acid and the total acidity remained within normal limits. Changes on the part of the acidity were observed only on the day the pain stimulus was inflicted.

The activity of the protease was significantly decreased after the pain stimulus, comprising 50-60 % of the average findings for the control experiments in the first series and 15-20 % in the second series. The activity of the lipase was little changed on the day the pain stimulus was inflicted, but on the following day it significantly increased (1.8-2 times). The activity of the protease and lipase approached that of the average findings for the control experiments on the 4th-13th day.

For the same period the specific weight and dry remainder were increased (2-2.5 times). The increase of the dry remainder occurs at the expense of the organic substances containing no nitrogen; the quantity of inorganic substances remained within the normal limits. The content of chlorides and also total and residual nitrogen was unchanged by the effect of the pain.

It was characteristic that all of the changes in the composition of the gastric juice after the infliction of the pain stimulus were especially sharp and clear in the second series of experiments, when the stimulus was inflicted at the time of maximum secretion. From this it follows that the functional conditions of the gastric glands play a highly important role in the changes of the composition of gastric juice, which are observed from the effect of a strong pain stimulus.